INTRODUCTION TO OCF AND IoTivity

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Massively connected systems exist today...

- Before IoT: Apps on Rich Devices communicate with Services in the Cloud or in Data Centres
- Comms are relatively easy for developers with well defined standards, including security & identity
So, what’s changed with IOT…?

• Moore’s Law marches on...
  • Lower cost compute power
  • Lower cost communications

• Now realistic to put compute & comms in small, fixed-function devices

• Devices you were already going to buy will now be smart & connected
  • Very fast ramp in volume
  • And some new types of devices too!

• Explosion in the amount of data & number of control points
Communications just got a lot more complicated!
The architecture will need to achieve massive scale
Summary of Challenges for IOT Communications

• Value will be delivered by apps & services, and...

• Apps & services need access to data & control points to deliver that value, but...

• Developers find it difficult to access all the data and control points

• Use cases are more complicated

• The system and therefore comms needs to achieve massive scale

• The solution must work across form factors, OSs, platforms, manufacturers, service providers and vertical markets.

• The solution must also scale from constrained devices to smart devices to the Cloud
OCF Addresses These Challenges

• Make it easy for developers to deal with the complexity of IoT comms
• Provide a common data model that developers can use to interface with all IoT devices and data
• Deliver as much interoperability as possible in the short term
• Provide a path towards future consolidation
• Supports the needs of multiple vertical markets (since many use cases span multiple vertical markets)
• Establish an architectural foundation that can achieve the necessary scalability
OCF – spec and open source under a single governance

- Board of Directors
- Standards Work Group
  - Specifications
  - Certification
- Open Source Work Group
  - Planning / Marketing / Etc...

- IoTivity Steering Group
  - Projects
  - Functions
Develops reference implementation of the OCF specification
OCF – Key Concepts

• Free IPR License (Code: Apache 2.0 & Spec: RAND-Z)
  • License covers both code, standards and related IPR
  • License applies to members and affiliates of members

• Dedicated and optimized protocols for IoT (e.g. CoAP)
  • Specific considerations for constrained devices
  • Fully compliant towards RESTful architecture
  • Built-in discovery and subscription mechanisms

• Standards and Open Source to allow flexibility creating solutions
  • Able to address all types of devices, form-factors, companies and markets with the widest possibility of options
  • Open Source is just one implementation to solve a problem

• Certification and Logo program
  • Use of certified Authorized Test Labs around the world
OCF Conceptual Framework

Profiles
- Consumer
- Enterprise
- Industrial
- Auto
- Education
- Health

Core Framework
- Interaction / Data Model
  - Resource Model
    - Discovery
    - Data Transmission
    - Data Management
    - Security, Identity & Permissions
- Device Management

Transports
- Bluetooth
- Wi-Fi
- Direct
- LTE
- Remote Access
- Cloud
- ZigBee

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OCF Resource Model

- The resource model, coupled with the common data model, provides the base interoperability of OCF
- Any physical or software artifact on a device that needs to be manipulated or made visible across the network can be described via the resource model
- A resource has a URI and a collection of Properties
  - The following Properties are mandatory:
    - Resource Type (‘rt)
      - ‘oic.r.light’
    - Resource Interface(s) (‘if’)
      - ‘oic.if.a’
    - Resource Properties with associated key/value pairs
      - ‘status: binary’
OCF Interaction Model - CRUDN

• CREATE
  • Create a new Resource on the Server

• RETRIEVE
  • Get the current State or representation of a Resource from a Server

• UPDATE
  • Request a partial or complete update to the information stored in a Resource

• DELETE
  • Remove a Resource from the Server

• NOTIFY
  • Request asynchronous notification of state changes in a Resource
Accessing Resources over the Network
Accessing non-OCF Resources

Application

Resource Model

Discovery Comms Device Management

Security, Identity & Permissions

Transport Abstraction

API - Language Mapping

Protocol Plug-In Manager

Protocol Plug-In

Resource

Comms

Local IP

Bluetooth

LE

Shared Transport
OCF Security Summary

- OIC key management supports end-to-end device protection
  - DTLS link-layer
  - ECC, AES, X509

- Resource layer ACLs allow intended interactions while preventing unintended interactions
  - ACL permissions
    - Resource, interface, wild-card
    - CRUDN

- Secure device ownership helps prevent attacks when devices are added to the network
OCF Data Modeling - oneIoTa

• Online tool for designing interoperable device data models for the Internet of Things
• Outputs RAML and JSON files that are instantly compatible with the OCF RESTful architecture
• Enables crowd-sourcing of data models
• Device data models can be used to generate documentation, code stubs and user interfaces
• [http://oneIoTa.org](http://oneIoTa.org)
To Summarize…

The Open Connectivity Foundation (OCF) was announced Feb 2016

- OCF solves connectivity challenges for OEM’s and developers
- Microsoft, Intel, Qualcomm, Electrolux, GE, Cisco and Samsung have come together and formed OCF with the intention of unifying standards efforts
- IPR Policy following established industry norms
- Technical foundation is a cloud-native architecture to achieve massive scale
- Full interop with AllSeen and other ecosystems planned

OCF on track to grow to over 300 members by the end of 2016

- Well-resourced efforts in Smart Home, Industrial, Automotive, and Health
- Top OEM’s, brands, operators and service providers from around the world are now joining
- Continuing efforts to further converge the industry

Now is the time to join OCF and help lead
THANK YOU!

For more information:-
https://www.openinterconnect.org
https://www.iotivity.org